water is pumped through spraying nozzles screwed into a system of pipes placed over the pond. A head of about *20* ft. of water is required for this purpose, and this represents the net expenditure of 20 ft.-lb. of work on each pound of water pumped. In some arrangements the spraying nozzles eject the water upwards and sideways, and it then falls into the pond or tank as a fine shower. In other arrangements the nozzles are in an elevated position and spray downwards, but this generally absorbs extra power in pumping, and may require an enclosure of boards arranged louvre fashion to prevent some of the spray being carried away by the wind in crowded districts. One form of spraying nozzle is shown in fig. 30, as made by Messrs. Ledward & Beckett, Ltd. The issuing water is given a rotary motion, causing it to spread out on leaving the nozzle, and it therefore splits up readily into small drops.

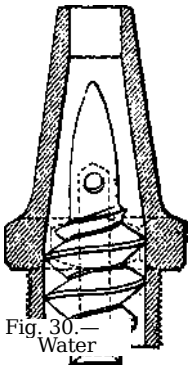
Fig. 30.—Water

The superficial ground area required for efficient spray cooling may be taken at about i sq. ft. per 5 Ib. of steam condensed per hour with a vacuum of about 26 in. If necessary this area may be reduced, but at the expense of reserve cooling area in calm weather.

Cooling Towers.—Where sufficient land for a cooling pond is not available, or is too dear, the cooling of the water for a large power plant is sometimes a difficult problem. For a small plant a simple cooler may be adopted consisting of thin boards set louvre fashion and exposed to the air and winds, and over these the water is allowed to trickle. The water is distributed by a trough at the top of the cooler and eventually falls into the tank or pond below. Two sets of boards may be used, placed at right angles to one another, so that, whatever the direction of the wind, one set or other will be fully exposed to it, or both sets will be partially so, the wind passing through the spaces left by the

louvre formation of the boards. In a crowded district it may be necessary to surround the cooler with a louvre frame of wood to prevent the wind carrying water spray away.

Chimney coolers are usually adopted for large powers. The water is pumped to a height of about 25 ft. and descends by gravity, being distributed by special troughs to fall on to splashbars, thin boards, or drain tiles. Above this is arranged a wooden chimney or tower, as shown in fig. 31. The draught of air is created by the chimney effect of the heated air and vapour inside the chimney, and this action is the more intense the hotter the water, being so far more or less self-regulating. The chimney is usually carried to a height of 60 or 70 ft.

The arrangement adopted by The Premier Cooler and Engineering Co., Ltd., is shown in fig. 31. The condensing water is delivered to a central trough, and is then distributed by auxiliary troughs running at right angles to the main one. A series of nozzles in the bottom of these troughs distributes the water on to the top of splashing plates set directly under-